

REMARKS

Claims 4, 18 and 19 have been canceled, without prejudice, and therefore claims 1-3, 5-17 and 20-25 are currently pending. Claims 1, 5, 15 and 20 have been amended herein. No new matter has been added. Applicants request reconsideration of the pending claims in view of the foregoing amendments and following discussion.

Claims 1-3, 6 and 10-14 have been rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,694,944 to Agama et al. (“Agama”).

In order to reject a claim under 35 U.S.C. § 102, the Office must demonstrate that each and every limitation is identically disclosed in a single prior art reference. See Scripps Clinic & Research Foundation v. Genentech, Inc., 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). The identical invention must be shown in as complete detail as is contained in the claim. M.P.E.P. § 2131.

Independent claim 1 has been amended to include the features of dependent claim 4, i.e., the step of enriching a fuel-air mixture in the at least one prechamber to a rich level, which feature, as the Examiner has acknowledged, the Agama reference does not disclose. It is accordingly submitted that claim 1 and its dependent claims 2, 3, 6 and 10-14 are not anticipated by Agama.

Claims 1-3, 6, 15, 16 and 23-25 have been rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Published Patent Application No. 2004/0237929 to Sun et al. (“Sun”).

As noted above, independent claim 1 has been amended to include the features of dependent claim 4, which, as the Examiner has acknowledged, the Sun reference does not disclose. It is accordingly submitted that claim 1 and its dependent claims 2, 3, and 6 are not anticipated by Sun.

Since independent claim 15 has been amended in a manner similar to claim 1, it is submitted that claim 15 and its dependent claims 16 and 23-25 are also not anticipated by Sun.

Claims 1-3, 6, 15, 16 and 23-25 have been rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,067,458 to Bailey (“Bailey”).

The Examiner has acknowledged that the Bailey reference does not disclose the step of enriching a fuel-air mixture in the at least one prechamber to a rich level, which feature has been incorporated into amended independent claims 1 and 15. It is accordingly

submitted that claims 1 and 15, as well as their dependent claims 2, 3, 6, 16 and 23-25, are not anticipated by Bailey.

Claims 4, 5, 7, 8, 15-20 and 22 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Agama.

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a prima facie case of obviousness. In re Rijckaert, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish prima facie obviousness, three criteria must be satisfied. First, there must be some suggestion or motivation to modify or combine reference teachings. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This teaching or suggestion to make the claimed combination must be found in the prior art and not based on the application disclosure. In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Second, there must be a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091, 231 U.S.P.Q. 375 (Fed. Cir. 1986). Third, the prior art reference(s) must teach or suggest all of the claim limitations. In re Royka, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

As noted above, independent claim 1 has been amended to include feature of now-canceled claim 4, i.e., the step of enriching a fuel-air mixture in the at least one prechamber to a rich level. While it is asserted in the Office Action that the addition of this step would have been obvious “since this would have been an alternate way of aiding the self-ignition within the prechamber,” it is respectfully submitted that the Examiner’s obviousness conclusion is deficient as a matter of law since the Examiner’s proposed modification would be inconsistent with the principle of operation of the prior art invention being modified. (See MPEP 2143.01 (citing In re Ratti, 270 F.2d 810 (C.C.P.A. 1959)).

In Agama, the movement of the piston in the prechamber creates a vacuum which draws fuel and air from the main combustion chamber into the prechamber. (See Agama, paragraph 26). This vacuum-based drawing of fuel and air does not constitute a direct injection of fuel and air into the prechamber, which may be achieved, for example, using a direct intake valve into the prechamber from the intake manifold. According to this process, Agama would only seek to control a fuel/air mixture in the main cylinder but not in the prechambers, since there is no separate provision of fuel/air to the prechamber(s). Thus, there would be no reason to enrich the fuel/air mixture in the prechamber(s) using the Agama process, and doing so would be inconsistent with the principle of operation disclosed by Agama.

For at least this reason, it is submitted that claim 1 and its dependent claims 5, 7 and 8 are not rendered obvious by Agama.

Since independent claim 15 has been amended in a manner similar to claim 1 (amended claim 15 incorporates features of now-canceled claims 18 and 19), it is submitted that Agama also does not render obvious independent claim 15 or its pending dependent claims 16, 17, 20 and 22.

Claims 9 and 21 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Agama in view of U.S. Patent No. 4,898,126 to Merritt ("Merritt") or U.S. Patent No. 5,109,817 to Cherry ("Cherry").

Claim 9 depends from independent claim 1, and claim 21 depends from independent claim 15. Neither the Merritt reference nor the Cherry reference cures the deficiencies of the primary Agama reference as applied against parent claims 1 and 15, since both Merritt and Cherry fail to teach or suggest a prechamber in which auto-ignition takes place, let alone teach enriching the fuel/air mixture in such a prechamber.

For at least this reason, it is submitted that claims 9 and 21 are patentable over Agama in view of Merritt or Cherry.


CONCLUSION

In view of all the above, it is believed that pending claims 1-3, 5-17 and 20-25 are in allowable condition. It is therefore respectfully requested that the rejections be reconsidered and withdrawn, and that the present application issue as early as possible.

Respectfully submitted,

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Dated: 8/4/05

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